

A SIMPLE METHOD OF MEASURING THE THICKNESS OF INCLINED STRATA.*

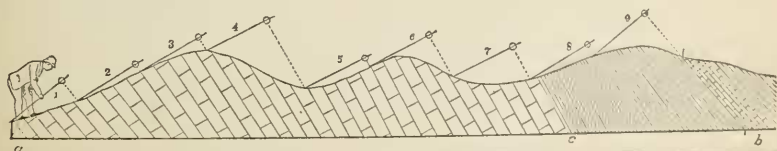
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When I began the study of the highly-inclined strata in Washington County, N. Y., during the field season of 1886, I found it necessary to measure the thickness of several sections where the surface was irregular, and the outcroppings of the strata numerous, though not continuous on the direct line of the sections.

Having used the Locke level in measuring horizontal strata, taking the distance from the ground to the eye as the unit of measurement, it occurred to me to substitute a clinometer compass for the level, and a rod, instead of my body, for the unit of measure. The compass was securely fastened to a light rod, so that the sights were on a level with the eye when the rod was standing upright and resting on the ground, and the clinometer needle at zero. The strata, in the section to be measured, were inclined to the east 40° . Placing the lower end of the rod at the base of the section, I inclined the rod towards the edges of, and at a right angle to, the line of the dip of the strata, which was indicated by the needle of the clinometer standing at 40° . Then, looking through the compass sights, the point where the line of sight touched the ground was marked as the next station for the rod, and on this station the base of the rod was placed for the second sight, which was made exactly as in the first instance, and so on to the end of the section. Frequent trials were made, at the exposed outcroppings, to determine the angle of dip of the strata, so that the rod might be held at a right angle to it. In one section of curved strata, on the mountain side, the lower beds were horizontal whilst the upper beds dipped at an angle of 70° . By taking into account the angle of dip of the strata, at each of the measurements with the rod, so as to find the true line of sight (which is the angle of the dip of the strata), the thickness of the section was quickly determined.

Each individual who attempts to measure strata in the manner described should have the compass placed upon the rod just high enough to bring the sights on a level with the eye, the compass being so attached that when the rod is perpendicular the clinometer needle will point to zero.

The accompanying sketch illustrates the manner of measuring strata by this method.



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In the sketch the dip of the strata is 54° to 65° , and the inclination of the rod from the vertical the same, from the horizontal it is 36° to 25° .

The total thickness of the strata between the points *a* and *b* is equal to the sum of the nine measurements. If, as is the case with myself, the compass sight be 5 feet 8 inches from the base of the rod, it is 9 times 5 feet 8 inches, or 51 feet for the entire thickness, or 39 feet 8 inches for the limestone and 11 feet 4 inches for the shale from *c* to *b*.

The method of measurement is simple, and always available when a suitable stick of sufficient length can be obtained for holding the compass. It saves time and is sufficiently accurate for most field-work. If a Locke level is also carried by the geologist, to be used in measurements of horizontal strata, he can measure strata of any degree of dip, and know, after once passing over the section, very nearly the exact thickness, on the spot, without an elaborate series of measurements and calculations, as he has only to multiply the number of measurements made by the distance between the base of the rod and the sights of the compass, or, if measuring horizontal strata, the sight of the Locke level. I have used this method during two field seasons and find it the most satisfactory of any known to me.